

was a distinct abrasion of the skin over the most prominent and external part of the trochanter major; and if there was any deviation whatever from a directly lateral fall, the deviation must have been slightly posteriorly, as the man's trousers were covered with dust behind the torn part; but this probably arose from his having rolled backwards after the fall. The patient himself could not say whether he had fallen backwards or a little forwards, or exactly on his side; but the contusion which M. Rodet regarded as a diagnostic sign was there, and showed that the force was applied in a direction which he maintained must produce an extra-articular fracture, and yet dissection showed that the fracture was completely intracapsular, and thus this case clinically disproved M. Rodet's very ingenious, geometrical, and mechanical speculations, and deprived his alleged diagnostic sign of all its value. It might be said that the neck of the bone was somewhat altered in this case, and that M. Rodet admitted that such alteration might modify the results; but then in many, perhaps in most cases of fractured neck of the femur, the bone was altered, at least as much as in this instance, so that M. Rodet's sign thus again lost its value. As to there being no synovia in the joint, it was necessary to mention that circumstance, both as it was the fact, and because many eminent men mentioned inordinate secretion as the constant result of intracapsular fractures in the early stages of the accident.—*Dublin Med. Press*, May 15th, 1844.

36. *Process of reparation of fractured bone.* Mr. WILLIAMS exhibited to the Surgical Society of Ireland March 30, a preparation which he conceived to be interesting as affording an opportunity of examining a simple fracture during the process of reparation and besides illustrating one or two points of some importance. The subject of the accident was an old man, aged about seventy, emaciated and apparently of feeble constitution. The fracture was the result of direct violence, having been caused by the wheel of a car passing over the left femur, which was fractured at, or rather a little below, the point of junction of the middle and lower third of the shaft of the bone. He was brought to the City of Dublin Hospital on the 20th of January, and died on the 18th March, so that he lived fifty-seven days from the receipt of the injury; after such a period the formation of callus would, in a younger person, have been probably seen in a more advanced stage; but before drawing the attention of the society to the appearances actually exhibited in the preparation, it would be well to state, very briefly, some of the more prominent circumstances connected with the case during life. It was quite unnecessary to give any thing like a detail of the case; but a few observations were necessary. Thus it would be observed that the broken extremities of the bones overlapped each other considerably, to the extent, indeed, of nearly three inches. The reason of this was, that seeing the advanced age and debility of the patient, no attempt was made to treat the fracture by permanent extension in the straight position of the limb. The limb was, in the first instance, placed on the double inclined plane, and every possible care was taken to prevent the formation of bed-sores; the patient was, after the first few days, when the swelling and tension of the thigh had subsided, supported in the sitting posture on the side of the bed, the limb on the inclined plane being carefully slid out on a platform, and as a sore, nevertheless, began to form over the sacrum, and gangrenous phlyctenæ appeared on the toes of both feet, of the uninjured as well as of the fractured limb, he was soon transferred to Dr. Arnot's hydrostatic bed, but ultimately died in consequence of extensive sloughing over the sacrum. Had any attempt therefore been made to permanently reduce and coapt the fracture in the usual way, the fatal termination of the case would have been greatly accelerated, and hence the very considerable degree of overlapping observable in the present case. About fourteen hours after death the limb was examined. There were some remains of ecchymosis between the integuments and fasci lata on the front and external surface of the limb; the muscles presented a natural appearance, except in the immediate vicinity of the fracture, where they were still slightly infiltrated with blood. The fracture was oblique from above downwards, and from before backwards, and slightly from

within outwards. The inferior extremity of the upper fragment was displaced a little forwards and outwards, and the upper extremity of the lower fragment consequently lay somewhat internal and posterior to the upper portion of the bone. He (Mr. Williams) would first beg the society to inspect the vertical section he held in his hand of the broken extremity of the inferior portion of the femur; it would be observed that on the internal surface of the section callus was obviously deposited between the periosteum and the bone; the periosteum was somewhat, but not much thickened, and showed some slight marks of increased vascularity. On the external surface of the same section, however—that is to say, on the aspect of the fracture, which, though not in contact with, yet corresponded to the inner surface of the upper fragment of the femur, the callus or new bone was deposited in quite a different situation; here there was no bone whatever formed between the periosteum and the old bone, but there was an abundant formation of callus external to the periosteum, deposited on its outer surface and in the muscular and other tissues intervening between the two overlapping portions of bone, and the new bone thus deposited in the heterogeneous tissues external to the periosteum had extended nearly to, but not quite in contact with, the surface or the periosteum of the overlapping upper fragment. In order to make the matter clearer, this vertical section of the semi-diameter of the bone had been detached transversely by the saw, and here, on the one side, the periosteum could be clearly traced over the newly-formed bone, while on the other, or outer side, facing the upper or overlapping fragment of the femur, the periosteum was clearly traceable between the femur and the newly-deposited bone, while not a particle of callus was deposited at this side beneath the periosteum—that is to say, between that membrane and the original bone. If the upper portion of the femur is now examined, we find a very different condition of things; in it there is no attempt whatever at osseous reparation, so far from it that, on the contrary, there is actually atrophy of the extremity of the bone; thus the transverse diameter of the femur is diminished from within fully an inch of its broken extremity, so that the bone tapers off in a conical shape, and, moreover, the medullary canal is considerably increased in breadth, and thus the actual quantity of bone in the upper portion of the femur is greatly diminished, while no new bone is deposited. Mr. Williams said that he thought this remarkable difference in the condition of the two fractured extremities of the femur was explained by the situation of the fracture, which had occurred about half an inch above the entrance of the great nutritious artery of the femur, which might be seen here, and as it seemed to him of remarkably large size. Here it was entering the lower fragment about half an inch below its broken extremity, which was thus suitably supplied with blood; the parts could therefore generate new bone, while the deficiency in this respect, in the upper fragment, might be partly, at least, referable to the supply of blood from this artery being cut off by the complete rupture of the nutritious artery of the bone. The condition of the tissues between the overlapping portions of the bone should be mentioned; the cellular tissue was more developed and denser than natural, and much of the muscular tissue seemed absorbed, at least it was intersected with fibrous or cellulose-fibrous septa, rendering the entire of the connecting medium between the overlapping portions of bone dense, resisting, and apparently in a transition state, into a fibrous or fibro-cellular tissue. In this dense structure, as already particularly remarked, new bone had been at the upper part deposited, and that to such an extent, that, had the patient lived, bony union might, Mr. Williams thought, have been effected, notwithstanding the impossibility of keeping the opposed surfaces of the overlapping bones in close and firm contact. He (Mr. Williams) would just observe that he thought this preparation, in the first place, showed that the formation of bone is not limited to any particular tissue, that, as his friend Dr. Macdonald and others maintained, whenever deposition of bone is effected, it is by the nutritious vessels of the part in which the bone is required to be deposited acquiring the power of secreting bone. In the present preparation the deposition of bone was quite irrespective of tissue, but was entirely subordinate to a due supply of blood; this preparation, therefore, he

thought, tended to show that the great difficulty of bony union in some fractures, such as intracapsular fracture of the neck of the femur, fracture of the patella, &c., was not so much due to any other peculiarity in the structure of the parts engaged in those fractures as the sparing supply of blood they are furnished with. Mr. Williams said that Dr. Houston had examined a section of the callus from this case with the microscope, and the detached islets of bone in the yellowish opalescent cartilage were quite obvious.—*Dublin Medical Press*, April 17th, 1844.

At a subsequent meeting of the society, (April 13,) Dr. Houston described the appearances which he had observed in a microscopic examination of a piece of callus from this patient. A section of this callus looked, to the naked eye, like a piece of cartilage—bluish, homogeneous, and compact; but when dried and examined with the microscope, it exhibited in every part innumerable points of ossification—some, isolated and distinct; others, agglomerated in heaps—the whole being evidently in a stage of transition from cartilage to bone. A similar condition Dr. Houston presumed would have been found in his case at a certain parallel stage of its progress towards reparation. Here, most probably, as the result of the irritation of the setons in the ossifying atmosphere of the bone, there had been, in the first place, an effusion of plastic lymph or jelly; then a conversion of this material into an organized bed of cartilage; and finally, an accumulation of osseous matter in the cartilage, at first in the form of minute isolated points, but in time, in such abundance as to repair the lesion and make firm the bones. Acting on the presumption that about the third week was the period at which, if at all, the cartilaginous bed had been formed, and the process of laying down the bone had commenced, he had chosen that time for the removal of the setons; and he had withdrawn them, thread by thread, with a view of guarding against the extremes, either of too great irritation, or of a premature cessation of the reparative action, one or other of which would have been likely to have attended on a forcible and sudden removal of all, at the same moment. He had thought it right, too, not to leave the setons between the bones for a longer period than three weeks, lest a morbid rather than a sanatory action might be set up by the too long-continued presence of the foreign bodies.—*Ibid.*, May 1, 1844.

37. *Reproduction of Bone in Necrosis.* Professor SYME exhibited to the *Med. Chirurg. Society*, Edinburgh, on the 3d of April last, some specimens to show that new bone was formed by the periosteum.

In the first place he produced specimens of the imperfect reproduction which occurs in cases where a portion of bone is removed by mechanical violence, as in the operation of trepanning the skull. The loss of substance here is not completely supplied, but only lessened, by a scanty growth of new bone round the margin of the aperture, diminishing in thickness from the circumference towards the centre, where there is usually a portion of the space occupied merely by a ligamentous membrane. He further illustrated this, by showing the result of experiments on dogs, performed in the way that Sir A. Cooper suggested, by removing a part of the radius, while the ulna was left entire. Here, too, the vacuity is very imperfectly provided with a substitute, by a conical shaped process of new bone from each extremity of the old one, extending from the cut surfaces of the breach, and tapering towards each other, so as to leave a deficiency, occupied by a ligamentous texture. He next showed a similar result from disease in the human subject, nearly the whole shaft of the tibia having died and been discharged without the formation of a successor, the appearance presented being precisely like that of the dog's bone just alluded to, and the imperfection of the limb so great as to require amputation several years after cicatrization of the sores. He then contrasted this preparation with one of necrosis in its ordinary form, where the old bone lies surrounded by a new shell ready to take its place in the event of removal. It is obvious, that this effectual reproduction cannot proceed from the remaining old bone, since it should in that case never be wanting, as there is always part of the shaft left entire, while it